U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS
IN COOPERATION WITH THE TENNESSEE GEOLOGICAL SURVEY

SOIL SURVEY OF HENRY COUNTY, TENNESSEE

BY

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[Advance Sheets—Field Operations of the Bureau of Soils, 1922]

WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

[PUBLIC RESOLUTION—No. 9]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture"

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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SOIL SURVEY OF HENRY COUNTY, TENNESSEE

By ROBERT WILDERMUTH, in Charge, A. T. SWEET, and L. L. BRINKLEY, of the U. S. Department of Agriculture, and H. E. HAMILTON, E. S. PERRY, and J. H. AGEE, of the Tennessee Geological Survey

DESCRIPTION OF THE AREA

Henry County is situated near the northwest corner of Tennessee. The State of Kentucky forms the northern boundary. The eastern boundary is irregular, being formed by the Tennessee and Big Sandy Rivers. The other boundary lines are straight. The county has an area of 588 square miles, or 376,320 acres.

Physiographically, Henry County consists of two or more high plainlike areas, which have been so dissected by minor streams that only fragments of the former plains remain. Each of these isolated areas of approximately smooth country is surrounded by undulating or hilly areas, which separate them from other parts or fragments of the same original plain or from the other principal plains of higher or lower elevation. The hilly sections are rough in many places and in some places broken and badly gullied.

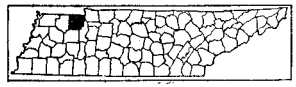


FIG. 3.—Sketch map showing location of the Henry County area, Tennessee

The smooth areas are most extensive in the western half of the county. A line drawn through a point 2 miles east of Hazel through Paris to Haglerville would mark an approximate boundary between the region of the old high plain areas and the more hilly and dissected region to the east. Along this line of separation is a more or less well defined, eastward-facing escarpment. From Paris south this escarpment is quite definite and can be seen distinctly by looking to the west from almost any point along the Paris-Mansfield road. North of Paris the Paris-Hazel road follows approximately the upper edge of the escarpment. East of the escarpment there is a low belt, from 1 mile to 1½ miles in width, which is underlain by clay beds referred to by geologists as the Porters Creek clay. South of Paris this low belt is well defined, but from Paris northward it is frequently obscured by gravelly areas. East of this low belt there are some fairly extensive plain areas and numerous broad-bottomed stream valleys. The greater part of the interstream upland in the eastern half of the county is undulating, rolling, and in places broken or hilly. Wide first bottoms extend along all the larger streams, and even along the very small streams there are stretches of bottom land of considerable width.

In the north-central part of the county, extending from the State line south to North Fork Obion River and from the escarpment line on the east to the hilly or rough country about the heads of Clear and Mill Creeks on the west, there is a high upland area the central part

of which is nearly level. The towns of Hazel, Puryear, and Conyersville lie near the western edge of this level area. South of the North Fork Obion River there is a narrow extension from this area which terminates in high gravel-capped hills about 2 miles north and northwest of Paris. The elevation of the railway depot at Puryear is 612 feet above sea level, which is approximately the maximum elevation of this highland area. On the east side this smooth belt is cut off abruptly by the rougher country through which numerous small streams flow into the Tennessee and Big Sandy Rivers.

The country lying on the west and south, between the high smooth belt around Puryear and the next lower area conforming with this, has been thoroughly dissected into a hilly region with numerous sharp divides, often gravel capped, and steep slopes. The edge of this relatively rough belt is marked on all sides by beds of gravel, 3 to 6 feet thick in places, the gravel ranging from about one-fourth inch to 2 inches in diameter. These beds are exposed at the gravel pits near the Paris-Whitlock road about 1 mile south of Hilltop and 3 miles due east from Whitlock. Gravel is exposed, also, on the steep hill slopes about 5 miles west of Puryear.

Grove High School at Paris has an elevation of approximately 600 feet above sea level, and the hilly region toward the south, which is cut off by the low belt on the east side, has many points almost as high. No gravel capping was found in this section but along the steep slopes of the eastward escarpment of this rough country outcrops of reddish-brown sandstone occur in many places. Viewed from the east, this escarpment rises rather abruptly through an increase in elevation of about 100 feet. The line of this escarpment is not straight, but meanders around the heads of the larger streams which take their rise high up on the slope. On the west slope this highland area has been considerably cut up by the small tributaries which lead eventually into Guins Creek and the headwaters of the Middle Fork of Obion River. This ridge and the country around Puryear form the watershed between streams flowing west into the Mississippi and those flowing east into the Tennessee River.

There are some other high but small areas which stand above the surrounding parts of the area because of the resistance of underlying sandstone beds. One of the highest of these is about a mile southwest of Halls Chapel School near Henry. Another is about 2 miles northwest of Cottage Grove, one is south of Hunt School, and one appears to be a westward extension of the gravel ridge north of Paris and about midway between Paris, Hilltop, and Shell Academy.

The elevation of the railway at Whitlock is 532 feet above sea level; of the Nashville, Chattanooga & St. Louis depot at Paris, 512 feet; and the railway station at Henry, 529 feet. The elevation at Routon is believed to be about the same. At approximately this level there are numerous almost flat areas which may be parts of a plain of more recent origin than that on which Puryear and Conyersville are located. This plain is extensive in the southwestern part of the county on the divides between the main tributaries of the Obion River. Here the smooth character of the upland is not so marked. Northwest of Paris this level upland extends from within about 2 miles of Paris by the way of Osage to within a short

distance of Hico School. West of Walnut Creek it extends from New Boston through Cottage Grove to Rosser Store. The characteristic smooth configuration of this plain is best seen along the road from Whitlock to Hico Church. Here is a broad flattish area cut off abruptly by the valley of the North Fork Obion River. and cut into numerous pieces by small tributary streams. All of this level upland has the appearance of being part of the original plain lying at an elevation lower than that around Puryear and Hazel.

On the west side of Walnut Creek a very pronounced high flat extends from a point about 2 miles north of New Boston School to the junction of the creek valley with the North Fork Obion River Valley, and then extends along the south side of this stream. In its upper part this flat is less than one-half mile wide, but downstream it becomes wider, reaching a maximum width of a little more than a mile. Its outer edge is clearly defined and for a considerable distance lies a little west of the Cottage Grove and Jones Mill road. This terrace area is about 60 feet above the Walnut Creek flood plain. On the east side of Walnut Creek near its junction with the river there are two distinct high terraces. The higher one extends from a slight rise a short distance south of Hico School, southward for nearly a mile, and probably corresponds in elevation with the terrace on the west side of Walnut Creek. Immediately north of Hico Church there is a rapid drop of about 20 to 25 feet to a second terrace.

East of the divide which separates the drainage flowing west through the Obion and its tributaries into the Mississippi from that flowing east into the Tennessee, there are also fragments of high flat areas, although they are not so extensive nor so numerous as west of the divide. On the east side of Blood River and Holly Creek there are other remnants of flats, but all of them are small and surrounded by hills and by steep ridges which are gravel capped in places. Still other level tracts like those in the eastern half of the county are to be found east of New Hope Church, extending eastward from Quillens Store.

Between the level of the uplands, as represented by the flat country at Puryear, and the low-lying areas there are extensive areas of hilly to broken country. In the western half of the county hilly areas are found along both slopes of the Paris-Haglerville divide. There are numerous smaller rough and hilly areas around the heads of many small streams.

In the eastern part of the county on both sides of Blood River and extending south of Freeland for 2 miles are many narrow ridges with steep slopes. North and southwest of Point Pleasant Church there are two large areas of rough, rolling country broken by numerous streams. Between the Big Sandy and Tennessee Rivers and from a point about 2 miles south of the mouth of the Big Sandy River, a large section is characterized by a series of long stream courses. The country along the Tennessee River, extending back from the bottom lands for varying distances, is for the most part high, rough, or rolling.

The stream valleys are unusually broad. Many small streams have valley floors from 40 to 60 or even 80 rods wide within 1 to 3 miles of their sources. The larger creeks have valley floors from

one-quarter to one-half mile in width, and the Obion and Big Sandy Rivers have valleys from one-half to three-quarters mile wide. Along the Tennessee River the bottoms average from one-quarter to one-half mile wide. The broad valleys are due to the ease with which the material in which the streams work is eroded rather than to the streams having reached grade. In many places the broad valley floors of the small streams are not flood plains, but terraces which overflow only during stages of unusually high water, the streams having cut to a lower level in deep V-shaped ditches. The large quantities of material carried down by these streams are readily noted where they enter larger stream valleys, the sediment being deposited in deltas at the mouths of the small streams. In many stream valleys there are areas of standing dead trees with deposits of material around their trunks.

At and near the heads of many small streams there are deep gullies with almost perpendicular banks. After once getting a start, these gullies do not work in one direction but finger out in many directions.

The range in elevation between the highest parts of the upland and the flood plains of the larger streams is probably about 150 to 175 feet.

The western half of the county is drained largely by the Obion River and its tributaries; the eastern half by the Tennessee and its tributaries. Small streams and branches reach practically all parts of the county, and there are only a few flats that are poorly drained. The streams for the most part have considerable fall and are actively cutting their channels.

Henry County had a population of 27,151 in 1920, of which 82.6 per cent was classed as rural. Paris, the county seat, had a population of 4,730. It is centrally situated, and a division point on the Louisville & Nashville Railroad. Henry, in the southwestern part of the county, had a population of 230; Puryear, in the north-central part, 325; Mansfield, in the south-central part, 50; Springville, in the east-central part, 100; and Manleyville, in the southeastern part, 100. A number of country stores and trading points are scattered throughout the county.

The creek and river valleys, although farmed to some extent or used for pasture, have practically no settlements within their limits. The broad, nearly level, and gently rolling areas of upland are generally held in rather large farms, so that the population is not quite so dense as in the hilly areas where the farms are smaller. With these variations, the distribution is fairly general over the county.

Henry County is fairly well supplied with railroads. The Louisville & Nashville Railroad enters the county near its southwest corner and leaves it near the center of the east side, passing through Henry, Paris, and Springville. This line gives direct communication with Memphis to the west, and Nashville, Louisville, and other points to the east. A branch line of the Nashville, Chattanooga, and St. Louis Railway, passing through the county from north to south near its center, extends from Paducah, Ky., to Hollowrock

Junction (Carroll County) on the main line, with connections in all directions.

The county roads are numerous, but most of them are in poor condition. Some have steep grades and are so rough as to be almost impassable, especially during wet weather, when they become deeply rutted. Roads surfaced with chert or gravel have been built for a distance of a few miles from Paris in several directions, and a broad, graveled highways runs from the southwestern to the northwestern part of the county. Telephones and rural mail delivery extend into all parts of the county.

Louisville furnishes the principal market for tobacco, as well as for some of the other products of the area. Livestock is shipped to Memphis, Louisville, and St. Louis.

CLIMATE

Henry County is characterized by a mild pleasant climate, without severe extremes of heat or cold, and usually without marked extremes of precipitation. Some snow falls during each winter, but the ground is rarely covered for more than a few days at a time. The county is well suited to a wide range of farm crops and to stock raising.

According to the records of the Weather Bureau station at Springville, the mean annual temperature of the county is 58.6° F., about 3 degrees lower than the mean annual temperature in Memphis.

The mean annual precipitation is 49.19 inches, with a range from 37.10 inches in the driest year to 70.47 inches in the wettest. The rainfall is well distributed throughout the year, the winter and spring seasons averaging a little more than 14 inches each and the summer and fall each a little more than 10 inches.

The average date of the latest killing frost in spring is April 10 and of the first killing frost in the fall October 22, giving an average growing season of 194 days. The latest date at which killing frost has occurred in the spring is May 2 and the earliest in the fall October 6.

With an average growing season of this length and a precipitation adequate even during the driest years, where proper methods are used to conserve moisture, crop failures are almost unknown.

Soil and climatic conditions here are well suited to the growing of corn, tobacco, clover, alfalfa, wheat, oats, sorgo, sweet potatoes, redtop, soybeans, cowpeas, and to early-maturing varieties of cotton. Bluegrass grows well in favorable situations, and Bermuda grass and lespedeza make luxuriant growths on both uplands and stream bottoms.

The table following, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from the reports of the Weather Bureau station at Springville.

Normal monthly, seasonal, and annual temperature and precipitation at Springville

[Elevation, 377 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1904)	Total amount for the wettest year (1919)	Snow, average depth
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	39.4	74	−22	5.47	7.19	3.43	1.1
January	39.6	79	−17	4.52	3.99	3.68	3.9
February	39.1	80	−11	4.18	1.92	2.84	2.2
Winter	39.4	80	−22	14.17	13.10	9.95	7.2
March	50.3	88	8	4.49	6.30	9.01	.8
April	58.3	89	23	4.91	3.22	4.58	.2
May	67.0	98	31	4.79	2.55	7.84	T.
Spring	58.5	98	8	14.19	12.07	21.43	1.0
June	74.5	104	39	2.66	2.67	2.81	.0
July	78.0	104	50	4.12	1.66	1.40	.0
August	77.2	105	47	3.28	1.60	8.64	.0
Summer	76.6	105	39	10.06	5.93	12.85	.0
September	72.1	105	33	3.53	4.08	7.05	.0
October	59.1	92	20	2.92	.59	9.84	.1
November	48.7	83	6	4.32	1.33	9.35	.4
Fall	60.0	105	6	10.77	6.00	26.24	.5
Year	58.6	105	−22	49.19	37.10	70.47	8.7

AGRICULTURE

Henry County is primarily an agricultural county, and produces a variety of crops. In the early history of the county, small patches of corn, tobacco, cotton, sweet potatoes, and wheat were grown for home use. Cattle were also raised to a small extent. All of the stream bottoms were covered with a heavy growth of timber and only small areas were cleared for farming. As settlement increased, corn, cotton, wheat, and tobacco became the main crops. Reports of the 1920 census indicate that wheat and cotton have decreased in importance, tobacco appearing to be taking their place as the chief crop. Sweet potatoes, also, are becoming more important.

Under the present system of agriculture the main crops are corn, tobacco, sweet potatoes, wheat, clover, and cotton. Cotton is grown mostly in the southeastern part of the county, while tobacco is planted most extensively in the western and northern sections. Crops of less importance are oats, rye, cowpeas, soybeans, timothy, alfalfa, potatoes, and sorgo (saccharine sorghum). Peanuts, fruit, and garden vegetables are grown for home use.

According to the 1920 census Henry County produced 918,627 bushels of corn in 1919, 67,226 bushels of wheat, 9,106,425 pounds of tobacco, 3,010 bales of cotton, 325,640 bushels of sweet potatoes, 25,450 tons of hay and forage, and 36,127 gallons of sorgo sirup. The total value of all the farm crops amounted to $6,006,176.

The area planted to corn in Henry County for the past 50 years has averaged about 50,000 acres annually, or about one-eighth of the

entire area of the county. The average yield has ranged from a little less than 20 bushels to a little more than 22 bushels per acre. Corn is grown in all parts of the county, and upon all the soil types, with varying degrees of success. The best corn soils are the Memphis silt loam of the upland and the various types of the stream bottoms. These are extensively used for this crop. The greater part of the corn is planted in drills on the level surface. It receives from three to five cultivations. Soybeans are planted to some extent in the corn, being seeded in the rows at the time the corn is planted, or between the rows after the last cultivation. Cowpeas are also planted in the same manner, but appear to be grown less than before soybeans came into such general use.

The area devoted to wheat, as reported by the last five censuses, has ranged from about 8,000 to 22,000 acres. During the last 20 years the acreage has gradually decreased. Only 7,804 acres were seeded in 1919. The yields are low, ranging in those census years from 6 to 11 bushels per acre. The crop is grown on the level to moderately rolling uplands. Oats have about the same distribution as wheat, but occupy a much smaller acreage. Oats yield an average of about 16 bushels to the acre. Many farmers grow wheat largely because it affords a good nurse crop for clover. In growing wheat commercial fertilizer high in phosphoric acid is used on many farms at the rate of about 100 to 150 pounds per acre. This treatment is said to be beneficial not only to the wheat but to the following clover crop. Bone meal and both raw rock phosphate and acid phosphate are used also.

Tobacco is rapidly advancing its position as the important cash crop. It is grown most extensively on the Memphis silt loam and the Lexington silt loam. It does well also on the Grenada silt loam. According to the reports of the census, the acreage has increased considerably since 1879, when the area in tobacco was 2,726 acres. In 1889 tobacco occupied 3,880 acres; in 1899, 5,221 acres; in 1909, 7,672 acres, and in 1919, 11,457 acres. The yield in these census years has ranged from a little less than 650 pounds to a little more than 800 pounds per acre. On some of the soils, however, yields as high as 1,500 pounds have been reported from efficiently managed fields.

Dark export tobacco is grown almost exclusively, the most popular variety being the One Sucker. Seed beds are made early in the spring, recently cleared land, "new ground," being used for this purpose usually, wherever such ground is available. Plants are ready for transplanting between May 15 and June 20. They are ordinarily set by hand in well-prepared fields. Some growers use from 100 to 150 pounds per acre of a complete fertilizer, but many use the same land year after year without any fertilization whatever. The tobacco is cured by artificial heat. Plate III, fig. 1, shows type of curing barn.

Where wheat or oats follow corn or tobacco, one method of preparing the seed bed is simply to go over the field once or twice with a disk harrow, after which the grain is either sown broadcast or drilled in. Better results are obtained where the land is given a deep, thorough breaking and harrowed to a good fine tilth before sowing, though where this is done it is better to plow some time before seeding in order that the soil may settle.

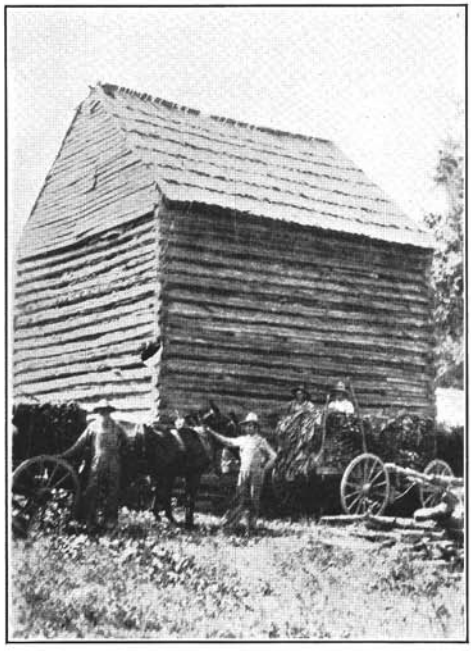
The early varieties of cotton are grown in Henry County. The crop is grown chiefly in the southern part of the county on both the upland and stream-bottom soils. After the stalks of the previous year have been broken down, the land is generally broken flat and later thrown up in ridges, on which the seeds are planted late in April or in May. Cotton yields from about one-quarter to one-half bale per acre, though yields of 1 bale are possible with careful culture. This crop is not grown as extensively as formerly, as this region is a little too far north for the best success with cotton and more profitable results are obtained from other crops.

Sweet potatoes do very well on the Lexington silt loam and the better drained areas of the Collins silt loam. The crop is grown largely in the southern part of the county, and its acreage has increased a good deal during the last decade. According to the 1920 census, 2,295 acres were devoted to sweet potatoes in 1919. The average yield in that year was 143 bushels per acre. Sweet potatoes are stored in drying houses erected for that purpose, and held until marketing conditions are favorable. A cooperative association has been organized by some of the farmers who grow sweet potatoes as a main cash crop, and this is reported to be a successful enterprise.

The area in hay and forage crops in 1909 was 20,222 acres, and the production was 18,035 tons. In 1919 the total area in hay and forage was 25,218 acres, with a yield of 25,450 tons. (See Plates IV and V.) Bermuda grass, timothy, and redtop are the principal grasses grown for pasturage and hay, along with clover and some alfalfa. Cowpeas and soybeans are becoming increasingly important as forage crops and for turning under as green manure. These crops do well on the upland soils and the better drained bottom lands, and they should be grown extensively as soil improvers, as well as for hay. Most of the soils will grow red clover, although the poorly drained bottom lands and the poorer hill lands are not suited to clover. Lespedeza grows wild on all the soils of the county, but does best on the more productive, better drained types. Few farmers have seeded lespedeza. Alfalfa has been grown with good success on a few acres of the Memphis silt loam and Elk silt loam, and its production could well be extended. A large area of bottom land throughout the county now unused could be advantageously used for valuable hay crops or for pasture.

Only a small acreage of rye is grown. It can be grown advantageously as a cover crop, affording good pasturage until the time for planting other crops, when it can be plowed under to supply needed organic matter.

The livestock industry is confined largely to the raising of hogs, cattle, and a few mules. The production of hogs receives most attention and can well be extended. Nearly all the farmers have one or two cows and some fatten a few steers each year. At the present time dairying is of little importance. The raising of stock should prove profitable on the rough rolling lands and on the greater part of the bottom lands where pastures have been established. Purebred animals are too scarce and improvement of the herds is badly needed. Large quantities of eggs and poultry are shipped from the county, but only a few farmers have specialized in poultry. The raising of sheep receives very little attention.



S. 10632

FIG. 1.—TYPICAL TOBACCO BARN

S. 10630

FIG. 2.—CUTTING TOBACCO ON MEMPHIS SILT LOAM

S. 10678

FIG. 1.—AN ALFALFA FIELD LATE IN OCTOBER AFTER THE THIRD CUTTING

Typical farm improvements on Memphis silt loam in the background

S. 10639

FIG. 2.—A FIELD OF RED CLOVER IN NOVEMBER

Red clover furnishes good late pasturage after the second cutting. Soil type, Memphis silt loam

Commercial fertilizers, though not used generally throughout the county, are coming more and more into use. In 1909 the amount expended for fertilizers was $5,068, while in 1919 it was $54,026. As the fertilizers are usually applied without much consideration of the requirements of the soils and the different crops, the returns do not always justify the expense. Generally, tobacco receives the larger part of the fertilizer, in acreage applications of 100 to 150 pounds. Further experiments on the different types are needed to supply information relating to efficient fertilizer practice. Lime has a beneficial effect on all the soils of the county, but very little of it is used.[1] Most of the soils are in need of lime.

Throughout the county there is little attention given to the rotation of crops.[2] The main crops, tobacco and corn, are frequently grown continuously for a period of years in the same fields. Only a few farmers are growing clover and cowpeas in rotations with their other crops. Where rotations are practiced, the upland soils have suffered less from erosion, and more profitable yields have been obtained. Some system of crop rotation is necessary on all the soils of the area, in order to obtain the best results. The most common scheme of crop succession planned to improve the land is corn or tobacco, followed by wheat, and this in turn, by clover or clover and grass. With the proper care and the more extensive growing of legumes, many of the soils could be brought to a high state of productiveness.

Some crops have been found to be better adapted to some soils than to others. Red clover, for example, is specially adapted to the Memphis silt loam in Henry County. It frequently produces two crops in one season, so that one can be harvested, and the second crop be plowed down to supply humus. Red clover has wonderful power to build up fertility, and it may be grown successfully on other upland soils and on the well-drained bottom lands of the county. Tobacco is also grown extensively on the Memphis silt loam, and where some attention is given to the proper cultivation of this crop, the yields obtained are satisfactory. On the better drained areas of the Collins silt loam, sweet potatoes are grown by many farmers. Some state that the quality is better on this soil than on the upland types.

On bottom lands where drainage conditions are poor, but the soil is not too wet, shallow-rooted crops may be grown. Redtop, alsike clover, lespedeza, and grass will afford good pasturage on these lands, and produce some hay. This fact should encourage stock raising on farms that include areas of this sort.

Many areas of formerly good land have been irreparably damaged by washing. Much of this land devastation could be prevented by utilization of the land, that is to say, the use of the steeper slopes for grasses and farm woodlots or forest, and the use of only the smoother lands for the ordinary crops, terracing all slopes.[3] A slope protected against erosion is shown in Plate VI, Figure 1. Three different

[1] For further information relating to the use of lime see Farmers' Bulletin No. 921, U. S. Dep. Agr., The Principles of the Liming of Soils, and also bulletins on liming, especially No. 119, published by the University of Tennessee, Knoxville, Tenn.

[2] Bulletin No. 109, Tenn. Expt. Sta., may be consulted for crop rotations and discussions relating to crops and fertilizers for west Tennessee conditions.

[3] See Farmers' Bulletin No. 1386, Terracing Farm Land, U. S. Dept. Agr.

stages of destructive erosion on unprotected slopes are shown in Plate VI, Figure 2, and Plate VII, Figures 1 and 2.

Most of the farm work is performed by the farmer with the aid of his family. Scarcity of labor seldom is a cause of delayed farm work, as most of the farms are small. In rush seasons the farmers sometimes help each other. The laborers employed are both white and negro, mainly the latter. Laborers receive at this time (1922) $1 to $1.25 a day. Where farm hands work by the month the wage ranges from $20 to $35, with board.

The size of farms in the county varies considerably. According to the census of 1920, the average size is 81.6 acres. There are a few very large farms in the county; a number contain from 200 to 500 or 1,000 acres, but the majority of the holdings range from about 20 to 150 acres.

Of all farms in the county 59.2 per cent are operated by owners, 40.3 per cent by tenants, and a few by managers. When the large farms are operated wholly or in part by tenants, they are usually leased on shares. If the owner furnishes the house and land, work stock, tools, and seed he receives from one-half to two-thirds of the crops. When he furnishes only the house and land, he gets from one-third to one-half of the crops. A few farms are rented for cash.

For the most part, present land values in the county are rather low. The price depends largely upon the location, the soil, the improvements, and the condition of the soil with respect to past treatment, that is, its state of cultivation and condition as to erosion. The price of the bottom lands ranges from around $10 to $75 an acre, and of upland from $30 to $175 an acre.

Henry County needs a more systematic rotation of crops, and a better preparation and cultivation of its soils. A definite rotation is essential for maintaining soil fertility. A proper crop rotation affords the easiest and most efficient means of keeping the soils in a productive state and at the same time increase the value of the farm. The injurious effects of growing the same crop continuously on a piece of land are generally recognized by farmers. Some change their crops from field to field, but they do not follow any systematic plan, taking the farm as a whole. A rotation involving grain and forage crops, especially the legumes, such as red clover, cowpeas, or alfalfa, and winter cover and humus-supplying crops, such, for instance, as rye, may be carried out with successful results.

On farms where the land is sour owing to poor drainage and a one-crop system, liming will prove beneficial. It will not only correct acidity, but also improve the physical condition of the soil. An application of 1 to 2 tons of ground limestone, or one-half as much of burnt lime, every three or four years can be recommended.

A mellow seed bed is necessary to make available the plant food that is stored away in the soil. For that reason the land should be thoroughly worked and harrowed. Shallow and frequent cultivations are necessary for corn, tobacco, and other intertilled crops. In growing tobacco it is essential that the land be in especially good tilth.

Some attention is given to the prevention of washing, but more effort should be directed to this matter. Terracing and contour cultivation should be practiced in all the hilly sections and on the more gentle slopes. Where the run-off is very rapid and cultivation

has not proved practical, the fields should be put into grass and used for pasture or planted to forest trees. Deep plowing in the fall would allow much of the rain which occurs during the winter to sink into the ground and be retained for the use of the spring and summer crops. Absorption by the deeply broken soil would greatly diminish the washing that now results from water flowing unrestricted down the slopes.

SOILS

The upland soils of Henry County have a close textural relation to the character of the parent material, although there are marked differences in some of the soils derived from similar parent material, according to the particular stage of weathering that has been reached in the development of the soil. There are two principal kinds of soil-forming material: (1) silty material that has the characteristics of loess, ranging from about 3 to 8 or 10 feet in depth; and (2) unconsolidated silts and clays similar to the sandy and clayey strata characterizing much of the Coastal Plain region of the Southern States.

The material of Group 1 overlies that of Group 2, except where the latter has been exposed by erosion. The principal soil derived from the material giving Group 1 is the Memphis silt loam, a light-brown to brown silt loam about 8 to 10 inches deep, overlying buff-colored or brownish-red silty clay loam to silty clay, which passes at about 16 to 20 inches into a less reddish and more silty layer. There is little or no mottling in the typical 3-foot section, and but little concretionary material. There is no evidence of free lime carbonate anywhere within the 3-foot section, nor in the substratum below this. The action of percolating water may have caused some concentration of clay in the upper part of the subsoil. The loessial material in the deeper beds near the Mississippi River usually contains some lime carbonate in the friable silty substratum material, but there is none at any depth in Henry County; in fact, entirely different material, which also is free of lime carbonate, is found in the substratum in Henry County.[4]

The Grenada silt loam, derived from the same kind of material as the Memphis, has a very striking individuality in that its lower subsoil, the material below depths of about 12 to 30 inches, is a light-gray, bluish-gray, or mottled gray, yellow, and brown, compact silty clay loam to silty clay, containing dark-colored and rusty-brown concretions and concretionary material. The surface soil is much like the surface soil of the Memphis silt loam, averaging perhaps slightly lighter in color, and the upper subsoil is also much the same, at least in many places, although it is more yellowish in the poorer drained areas. The principal difference between the Grenada and the Memphis appears to be a result of drainage. The Grenada soil, occurring on flat areas not favoring as rapid run-off of rain water as on the slightly more sloping or undulating Memphis silt loam, apparently has had some of its iron dissolved and carried to a lower level by percolating water and there concentrated. It is possible that

[4] Aside from the differences noted, this silty material of Henry County very closely resembles that lying along the bluffs east of the Mississippi River bottoms. There is very close resemblance in the color, texture, and profile characteristics and it should be noted that lime loving plants, as red clover, do well here as on the loessial soil near the river.

impervious underlying clays, such as constitute certain beds in the water-laid platform of the region, have impeded underdrainage in places, and thus indirectly brought about the development of the gray, compact lower subsoil.

The compact lower subsoil of the Grenada functions as a relatively impervious layer, impeding the downward movement of percolating water to the extent that after wet seasons water is often seen oozing out along the contact line of the compact layer and the less compact layer above, in road-cut sections, whereas no such seepage is noticeable at this depth in the Memphis. Further, it is believed that the compact layer impedes upward movement of subsurface water by capillarity in dry seasons. At any rate, crops suffer in dry seasons more on the Grenada, particularly that with the gray or mottled layer well developed and lying near the surface, than on the Memphis.

The Henry silt loam occupies small, poorly drained depressions, mainly in areas of Grenada silt loam. It is the result of wet conditions, the material originally being similar to that giving the Grenada and Memphis soils.

The Lexington silt loam superficially resembles the Memphis silt loam. The silty surface section and the red or buff-colored upper subsoil essentially conform to the corresponding sections of the Memphis. In the lower subsoil, however, there is a difference; the lower subsoil of the Memphis silt loam is a very silty clay loam or clay, containing but little sand, whereas the lower subsoil of the Lexington silt loam contains always a noticeable amount of sand particles, the texture in places being sandy clay. Structurally there is not so much difference, as even the sandy clay occurring locally in the lower part of the 3-foot section of the Lexington, when in a relatively dry condition is frequently as compact and as difficult to bore into as the much more silty corresponding section of the Memphis. The Lexington silt loam, as distinguished from the Memphis, is developed where erosion has removed some of the superficial material or where the original layer of loess was shallower, so that sandy, basal, water-laid deposits come within the 3-foot section, or material from them is mixed with the loessial material at the lower subsoil depth. The Lexington soil generally occupies much more rolling areas and erosion is decidedly more active, so that in time the thin layer of silty material, becoming thinner all the while, will be completely removed, and the more sandy textured or quartzose beds or stiff clay beds, as the case may be, of the basal water-laid deposits will be exposed. As it is, the areas of Lexington silt loam on the eroded slopes at present include patches of the latter kind of soil in gullies and other washes.

The soil and upper subsoil of the Pheba and Lexington are rather similar, but the lower subsoil of the Pheba is mottled grayish and yellowish, contains concretionary material, and is noticeably compact. The principal difference between the Pheba and the Grenada is that the lower subsoil of the former is noticeably more sandy, and the surface soil, when dry, usually is lighter colored. It appears that the gray of the lower subsoil of the Pheba is due, at least in places, to the gray color of the parent material. For example, the grayish lower subsoil of the Pheba in places is derived from gray clay representing the formation geologically known as the

S. 10654

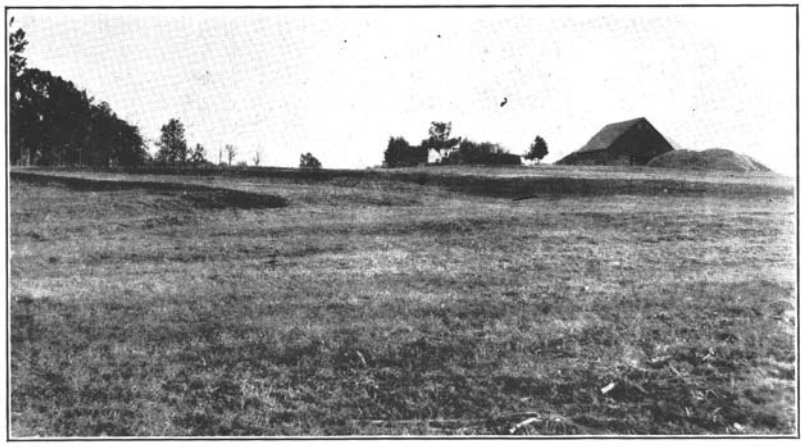
FIG. 1.—FIELD OF SOYBEANS ON LEXINGTON SILT LOAM

This crop is used extensively for hay and forage. Thin soil in foreground

S. 10686

FIG. 2.—SORGO IN SHOCK ON LEXINGTON SILT LOAM

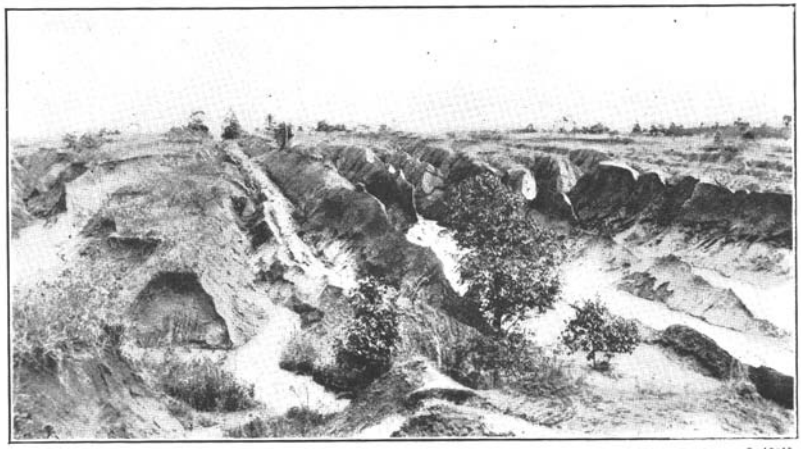
This crop is used rather extensively for roughage



S. 10725

FIG. 1.—GENTLE SLOPE ON MEMPHIS SILT LOAM PROTECTED BY LOW TERRACES TO PREVENT EROSION

The slope and surface soil are practically the same as on the abandoned field shown below



S. 10543

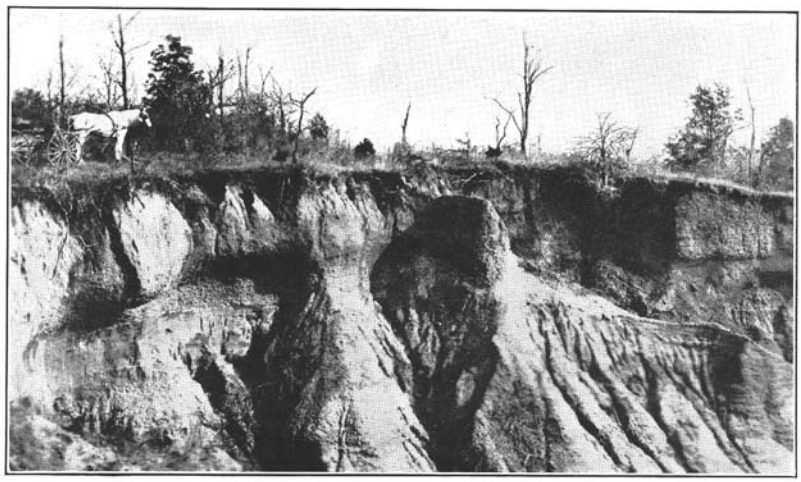
FIG. 2.—AN ABANDONED FIELD ON THE MEMPHIS SILT LOAM

Gullies represent an old road and former cotton rows. This land, on account of erosion, is practically worthless for agriculture

S. 10679

FIG. 1.—LAND IN PROCESS OF TRANSFORMATION FROM PRODUCTIVE LAND TO NONPRODUCTIVE

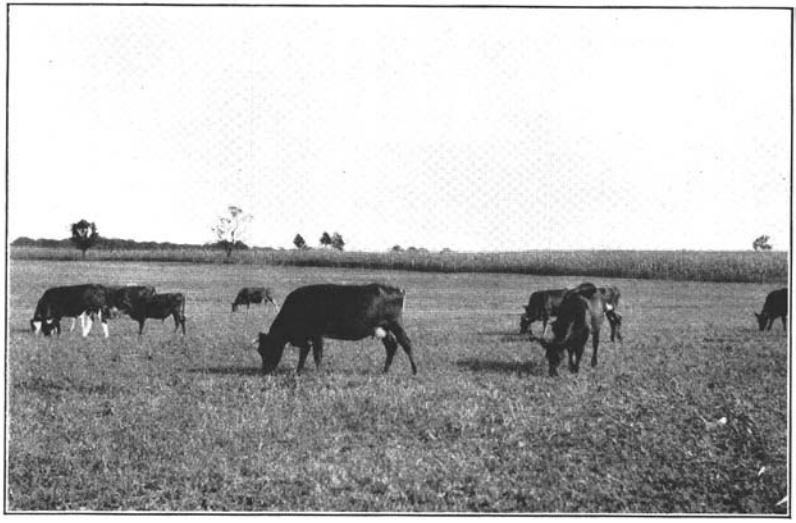
Low terracing or cover crops would prevent such destructive erosion. Soil type, Memphis silt loam



S. 10690

FIG. 2.—ADVANCED STAGE OF EROSION ON THE LEXINGTON SILT LOAM

Underlying beds of sand and gravel are exposed



S. 10647

FIG. 1.—GENTLY UNDULATING TOPOGRAPHY OF THE MEMPHIS SILT LOAM

Red clover in the foreground, corn in the distance

S. 10655

FIG. 2.—ROAD CUT THROUGH MEMPHIS SILT LOAM

This shows how the loess stands up in nearly perpendicular banks

Porters Creek clay—a clay of a shaly nature which is mined in the central part of the county for brick and pottery.

In the eastern part of the county there are considerable areas of sandy soils derived from the stratified, water-laid beds exposed here. These beds correspond to very extensive areas of sandy deposits occurring in the Coastal Plain region of the Southern States. The beds are largely unconsolidated, low in lime, and highly quartzose; locally they include (1) consolidated material, such as reddish and yellowish iron-cemented sandstone, and (2) highly argillaceous, stiff clays. There is an abundance of water-rounded gravel, mainly chert, in places. Some of this gravel, it should be stated, is present in the subsoil of some of the areas mapped as the rolling phase of the Lexington silt loam in the eastern part of the county. Here reddish silty clay constitutes the matrix holding the gravel. Proceeding down the slopes, the soil becomes thinner and thinner, the gravelly beds finally outcropping, giving rise to patches of Lexington gravelly loam which were not mapped on account of their small area.

The soils derived from these beds are the Ruston fine sandy loam and very fine sandy loam. They are grayish or very light brown in the surface section, slightly reddish where the surface layer is thin, and highly quartzose; the subsoil, beginning rather abruptly, is a light-red to reddish-yellow fine sandy clay, mottled some with yellow and other colors in places in the lower part of the 3-foot section. Locally the subsoil is somewhat stiffer than that of much of the Ruston soils mapped in other localities.

Some small areas of soil have been classed as Baxter gravelly loam. These consist of a brownish gravelly loam or silt loam underlain by a mixture of reddish silty clay and gravel. The gravel is composed of angular chert fragments. The material of this soil represents the residual products formed on the decay of an underlying cherty rock. Any lime carbonate that may have been present in the parent beds has been very largely removed during the process of soil development.

The alluvial soils have been separated into (1) first-bottom or recent alluvial soils and (2) second-bottom or terrace soils of older alluvium. There is close similarity between some of the important soils occurring in the first bottoms and some of those on the terraces; but the latter are no longer subject to overflow by stream waters, the channels having been cut to lower levels and flood plains developed conforming with this lowered position of the stream bed. The water table probably is nearer the surface on the terraces than in the uplands in the case of some of the terrace soils which resemble some of the upland soils, as, for example, the Lintonia of the terraces and the Memphis of the uplands.

The first-bottom soils, of course, are the youngest soils in the area; in fact they are being formed at the present time by sediments laid down over the surface at each overflow.

The Collins soils are formed of recent alluvium washed largely from the Memphis, Grenada, and Lexington upland soils. These have brown surface soils, yellowish-brown to yellow upper subsoils, and light-gray, bluish-gray, or mottled gray and yellow lower sub-

soils, usually compact and containing dark-colored or rusty-brown concretionary material. Near the banks of the streams there is less gray, very little or none in places. Here the underdrainage is better, and such soil would have been mapped as Vicksburg silt loam had the areas been of sufficient extent. This indicates that poor underdrainage caused by the nearness of the water table to the surface, or the presence of an impervious clay in the deep subsoil or substratum, is the principal cause of the gray layer. Probably the same conditions have given rise to the Olivier silt loam, a second-bottom soil much like the Collins.

Still poorer drainage conditions in the bottoms have given rise to the Waverly and on the terraces to the Calhoun, soils very similar in physical and probably in chemical characteristics.

These alluvial soils are all low in lime carbonate; they are high in silt and low in sandy or quartzose material.

The Lintonia silt loam is a terrace soil occupying well-drained areas. It has a brown soil and a buff-colored to brownish-red upper subsoil, with a tendency toward a more yellowish color in the lower subsoil. It is more productive than the Olivier silt loam, probably because of the freer internal movement of moisture and air.

In the bottoms of the Tennessee River the Huntington silt loam is the principal type. This is a brown, mellow soil only slightly heavier in texture and lighter in color in the subsoil. It has good drainage between periods of overflow, and is very productive. The various soils occurring in the drainage basin of the Tennessee River have contributed to the source of the soil material; these include limestone, sandstone, and shale soils, some loessial soils, and soils derived from water-laid, unconsolidated, Coastal Plain beds. Limestone wash probably has contributed a very considerable proportion of the material.

On the terraces of the Tennessee River the soil resembling the Huntington has been mapped as the Elk silt loam.

The Huntington and the Elk soils do not carry free lime carbonate, but their high productivity, like that of the Hagerstown soils of the Nashville basin and other localities, is believed to be due partly to the limestone origin of the material or part of the material in this case. Well-drained limestone soils, that is, those derived from the purer limestone, are without exception, markedly productive in the humid region of the United States.

The soil classed as Meadow includes soil material which is so variable in color and texture from place to place over the surface and through the vertical section that it can not be separated into soil types. This is highly complex, very young material, derived from the soils of the uplands, which is added to repeatedly by material washed from various sources, and there is little opportunity for assortment of the water-borne material, such as is possible in broad stream bottoms subject to deep overflow. Meadow occurs chiefly along the narrow streams. In places, especially along the outer edge of the flood plains, the material has simply been washed down from the adjacent slopes of the uplands.

For the purpose of soil mapping the soils are classified into soil series and soil types. Each series consists of soil types that are similar in color, origin, and structure, but differ from each other in texture, the relative coarseness or fineness of the surface soil.

In subsequent chapters of this report the various types are described in detail and their relation to agriculture is brought out. Their distribution is shown on the accompanying soil map. The table following gives the actual and relative extent of each soil type mapped:

Areas of different soils

Soil	Acres	Per cent	Soil	Acres	Per cent
Lexington silt loam	147,264	39.8	Waverly silt loam	3,968	1.0
Rolling phase	2,496		Lintonia silt loam	2,752	.8
Memphis silt loam	78,400	20.8	Huntington silt loam	1,664	.6
Collins silt loam	46,144	12.3	Imperfectly drained phase	832	
Meadow	28,864	7.7	Elk silt loam	1,856	.5
Grenada silt loam	21,888	5.8	Henry silt loam	1,536	.4
Ruston fine sandy loam	16,448	4.4	Baxter gravelly loam	1,216	.3
Ruston very fine sandy loam	8,640	2.3	Calhoun silt loam	768	.2
Olivier silt loam	6,272	1.7			
Pheba silt loam	5,312	1.4	Total	376,320	

MEMPHIS SILT LOAM

The Memphis silt loam consists of a light-brown to brown silt loam, underlain at about 8 or 10 inches by buff-colored, brownish-red, or reddish-yellow silty clay or silty clay loam, passing quickly into silty clay. With increase in depth there is a decrease in the clay content and an increase in silt, and the material is more friable, but is not less compact, and in places it is more compact at this lower depth. This change becomes noticeable at depths of about 16 to 20 inches, and below 20 inches the lower subsoil usually is distinctly more friable. Generally the color is more yellowish and less reddish in the lower subsoil, but in some places there is not much change in color within the 3-foot section. Locally the lower part is yellow or even pale yellow, but there seldom is any gray mottling. Some dark-colored concretionary material is noticeable in the lower subsoil in places, even where there is not much change in the color or in the degree of compaction. Typically the lower subsoil is a silty clay loam. Stratified beds of the Coastal Plain deposits, usually consisting of red to reddish-yellow sandy clay, are reached at depths of about 4 to 8 feet. In places the substratum consists of light-colored compact material, but generally this kind of material is overlain by Grenada or Pheba silt loam. Locally in forested tracts the soil is yellowish brown at or near the surface.

The soil section as a whole is more uniform both in color and texture than any other soil of this region. The surface layer of silt loam is markedly free from grit or sand of appreciable size, giving a very noticeable smoothness to the material. The silt content is higher in this Memphis type than in the usual silt loam of the Coastal Plains region to the southeast. The surface, when dry, especially on land that has been cropped until the humus content has been lowered considerably, is rather light in color; that is, grayish brown or even brownish gray. Wherever much of the dark-brown or rusty-brown concretionary material and gray mottling is found in the lower section, the soil should be considered either as an inclusion of Grenada silt loam or as a variation approaching the character of the Grenada.

In some places the surface soil has a deep-brown color and a friable or mellow structure. A representative boring of this variation revealed a deeper brown, mellow silt loam, about 8 inches thick, underlain by brown silty clay loam, passing at about 12 inches into reddish-brown or dark brownish red, friable silty clay and grading in the lower subsoil into reddish-yellow silty clay loam. Where the country has been thoroughly dissected by small drainage ways, the crests of some of the narrow ridges consist of Memphis silt loam in such small areas that it was impracticable to show all of them on the map. In places erosion has removed the silty surface soil, forming small patches or "gall" spots of Memphis silty clay loam. A few included areas contain fine sand derived from exposures of the underlying sandy strata; some of these approach the texture of a loam or of a fine sandy loam. Some spots contain sand in the lower part of the 3-foot section; these represent or resemble the Lexington silt loam.

The Memphis silt loam occupies most of the principal nearly level and gently rolling uplands in the western part of Henry County. A considerable area extends both north and south from Routon and from Henry to the southwestern corner of the county. An extensive tract lies east and south of Midway. Another almost continuous body extends along the west side of Walnut Creek from near Johnsons Chapel to Rosser Store, north of Cottage Grove. On the east side of Walnut Creek the type occupies the greater part of the uplands from Shell Academy to Hico Church, and east of that line to the Paris-Puryear road. In the eastern part of the county an area of the type lies near Quillens Store and several areas extend from Springville northward toward Buchanan. Small scattered bodies are found in many other places associated with the Lexington silt loam.

The greater part of the type is gently undulating, but some of it is flat and nearly level. Part of it is rolling enough to require terracing and contour cultivation to prevent damaging erosion, such areas occurring mainly on the slopes of stream valleys. The prevailing topography and a roadside bank are shown in Plate VI.

Both the surface and underdrainage are good. The soil retains moisture well and appears to have sufficiently good internal circulation of air and moisture to provide for the needs of crops in all but abnormally dry seasons.

This is the most important soil type in Henry County, because of its productiveness, its large extent, and its broad range in crop adaptation. It is well suited to all the crops grown in the area. Probably 65 to 75 per cent of the type is under cultivation. Most of the rest supports a growth of timber, consisting principally of white and red oak, walnut, hickory, tulip poplar, maple, black locust, dogwood, sweetgum, black gum, sassafras, chestnut, sycamore, and birch.

The crops grown extensively on this type are corn, tobacco, clover, sweet potatoes, cotton, wheat, and hay grasses, consisting of clover, redtop, Bermuda grass, and timothy, or a combination of these. The minor crops are oats, soybeans, cowpeas, sorgo, alfalfa, peanuts, broomcorn, fruit, and garden vegetables.

The yields of the various crops depend largely upon the thoroughness of cultivation and the system, if any, of crop rotation. If the

soil is in a good state of tilth and the seasonable conditions are favorable, corn yields from about 30 to 50 bushels per acre, and sometimes higher yields are reported, but the average yield of corn is lower. Tobacco yields from 800 to 1,400 pounds per acre. Some wheat is grown on this type, with a yield of about 12 to 15 bushels per acre, which is somewhat higher than the average for the county, but is seemingly lower than it should be on soil of this kind. Red clover is extensively grown as a hay and pasture crop and also as a soil improver.

This soil as a whole is well suited to red clover, and it is believed that sweet clover could also be grown to good advantage. Formerly it was the custom to use wheat or oats for a nurse crop, but many farmers now sow redtop and timothy alone, and it is reported by some that the results are better than when a nurse crop is used. The greater part of the clover is sown in the spring, but some land is seeded early in the fall. Lespedeza grows luxuriantly on this type wherever it has an opportunity to get a foothold, and it is sown to some extent. It grows wild in nearly every uncultivated clearing. Bluegrass succeeds, but not much is seen. Alfalfa does well, giving at least three cuttings a year. Owing to the care necessary to get a good stand and the work required to keep grass and weeds from choking it out, the acreage is small, most farmers preferring red clover to alfalfa.

This type is used extensively for the raising of livestock, hogs and cattle being found on nearly every farm and sheep on some. Dairying is carried on in a small way. Many farmers milk from 3 or 4 to 12 or 15 cows and separate and sell the cream.

Commercial fertilizers are used to a very small extent, manure and clover being depended upon almost entirely to keep up yields.[5]

[5] The following results of experiments with fertilizers on this type of soil are supplied by the Tennessee Agricultural Experiment Station:

Results of field experiments on the Nashville, Chattanooga & St. Louis Railway demonstration farm, near Paris, Henry County, 1918

Crop	Fertilizer per acre				Yield per acre
	Acid phosphate	Muriate of potash	Nitrate of soda	Manure	
	Pounds	*Pounds*	*Pounds*	*Tons*	*Pounds*
Clover and grass hay	300				2,100
Do		50			960
Do					941
Do	300	50			1,386
Do	300		160		2,070
Do	300	50	160		1,710
Do			180		996
Cotton	300				1,040
Do					480
Do			160		595
Do	300		160		860
Do	300	50	160		[1] 125
Alfalfa hay	600				2,980
Do		100			997
Do					985
Do	600	100			3,742
Do	600			12	8,294
Do				12	5,532

[1] Seed cotton.

This soil was found to be highly responsive to liming for such crops as clover and alfalfa.

Most of the farms on the Memphis silt loam are well improved, having good fences and farm buildings. The price of land ranges from about $75 to $150 an acre, depending upon the character of the land, condition and kind of improvements, distance from good roads and from markets, and condition of the soil with respect to past treatment.

The principal needs of this soil are an increase of the humus supply, deeper plowing and more thorough cultivation, improvement of the soil by the use of ground limestone or burnt lime, and the use of effective means, such as carefully laid out and constructed terraces, to prevent erosion on the sloping areas.

Continuous clean cultivation, such as is given tobacco, cotton, and corn, will ultimately deplete the supply of organic matter, where sufficiently heavy crops are not grown for the residual stalk, leaves, and roots of crops to overbalance the loss of that in the soil. The supply of organic matter may be increased by cutting and plowing under all stalks and grass, by growing crops like soybeans, cowpeas, alfalfa, sweet clover, and lespedeza in corn or alone, and occasionally plowing under one of these crops or of wheat or rye.

The subsoil of the Memphis silt loam, when brought to the surface in shallow places and allowed to weather out over winter, is said to add to the productiveness of the worn surface soil. Plowing should therefore be gradually deepened. The deeper seed bed would also add to the moisture-holding capacity of the soil in dry weather and increase the ease of root penetrability. Deep plowing also does much to check the rapid run-off and prevent erosion. Thorough and frequent cultivation not only prevents the growth of weeds and grass, but stimulates the development of beneficial bacterial growth.

Practically all this type gives an acid reaction to litmus, the more rolling and better drained areas giving the weaker reaction. Ground limestone or burnt lime undoubtedly will prove beneficial on this soil for all crops, especially for clover and other legumes except lespedeza. Lime will be necessary on much of this soil if alfalfa is to be grown.

Deep plowing, the use of cover crops, and care in filling all incipient gullies, will aid in the prevention of erosion, but the main dependence must be the use of substantial terraces, laid out correctly, and the use of the steeper slopes as grass and forest land.

GRENADA SILT LOAM

The Grenada silt loam is a light-brown to brown or yellowish-brown silt loam, usually slightly lighter in color at the surface than the surrounding Memphis silt loam, underlain at about 8 to 10 inches by yellowish-red to buff-colored or brownish-red silty clay loam to silty clay, which passes at depths ranging from about 12 to 30 inches into light-gray, bluish-gray, or mottled gray and yellow or brown silty clay or silty clay loam usually containing dark-colored and rusty-brown splotches of concretionary material and also small roundish concretions. Concretions in smaller amounts frequently are found on the surface and disseminated through the soil and subsoil. The lower subsoil typically is moderately to quite compact, especially

when dry. In places the upper subsoil is yellowish brown on the more nearly level areas.

This type differs but little from the Memphis silt loam in surficial appearance or in crop adaptation and productivity, where the gray layer is deeper than about 24 inches. When this layer lies much nearer the surface than this the type is not so productive nor so well suited to the legumes, especially clover and alfalfa, and warms up later in the spring. None of the type is quite so good, however, as the Memphis silt loam. The mottled compact layer appears to influence the moisture content of the soil considerably. Where it is near the surface the soil tends to bake in dry weather, drying out more completely than the Memphis silt loam or those areas of the Grenada silt loam which have the gray layer at depths of 2 feet or more.

In some areas the surface soil is yellowish brown to a depth of about 3 to 6 inches, grading into yellow silt loam, underlain by yellow silty clay loam mottled with gray or bluish gray. Some fine to very fine sand occurs locally in the soil and subsoil. North of Puryear in places the soil is a brown or mottled gray and brown silt loam about 8 to 12 inches deep, underlain by yellow, compact silt loam or silty clay loam, passing at about 24 to 30 inches into gray or bluish-gray silty clay mottled with brown. Patches of Henry silt loam too small to map are also included.

The Grenada silt loam is not very extensive. The largest area is in the north-central part of the county, extending from Puryear north to the State line. A large area lies about 5 miles northwest of Paris, another occupies the flat about 3 miles southeast of Salem and numerous smaller bodies are scattered throughout the county.

The type is prevailingly nearly level to only faintly undulating, so that in many areas artificial drainage is necessary for the establishment of proper surface drainage. The underdrainage is not good, and can be improved by ditching and tiling.

The type is not important agriculturally. It was originally in forest, largely of post oak, hickory, white oak, and red oak. The greater part of it is now under cultivation, being used principally for tobacco and corn or for pasturage. Tobacco does very well, with yields around 600 to 1,000 pounds per acre. Corn does not give best results on this soil; the average yields are low. The native grasses and lespedeza are well adapted to it. Redtop, timothy, oats, and wheat also give good returns. The better parts of the type are used to some extent for red clover. Crops on this type, however, are injured more by extremes of either drought or excessive rain than they are on the Memphis silt loam. This land ranges considerably lower in price than the Memphis silt loam.

The Grenada silt loam can be improved by providing better drainage. Surface drainage by means of open ditches will prove helpful; but where an outlet can be obtained, tile drainage probably will be more effective. The soil is strongly acid in reaction to litmus paper, and the application of ground limestone at the rate of 2 or more tons per acre, or burnt lime at the rate of about 1 ton, once in about five to eight years, after drainage has been provided, will be beneficial. Alsike clover can be grown, probably without drainage, and redtop grass will do well.

HENRY SILT LOAM

The Henry silt loam consists of light-gray silt loam, underlain at about 3 to 10 inches by light-gray to whitish rather compact silt loam showing some mottlings of yellowish brown or brown. At 20 to 24 inches the material generally is a mottled gray and brown or yellowish-brown silty clay, which becomes heavier with depth and in places is very dense. Small concretions are abundant from the surface down in many of the areas.

The Henry silt loam occupies poorly drained areas which are generally closely associated with or surrounded by areas of Grenada silt loam. Many patches of 2 or 3 acres of this soil, or of soil that is very similar to it, are included with the Grenada silt loam and the Memphis silt loam, because they are too small to show on the map. This type owes its distinguishing characteristics to the fact that it was developed under conditions of very poor drainage.

Owing to its small extent, poor drainage, and low productivity, the type is unimportant. Practically all of it is either in forest or in grassland. It is adapted to lespedeza and is best suited to grazing and hay land.

LEXINGTON SILT LOAM

The Lexington silt loam is a light-brown, brown, or yellowish-brown silt loam, underlain at depths of about 8 to 12 inches by buff, yellowish-red, or brownish-red silty clay loam or silty clay, which below depths of about 20 to 30 inches becomes more sandy and often more yellowish and somewhat more compact, in places consisting of sandy clay. It is closely related to the Memphis silt loam, representing areas which have been modified by removal of some of the surface material through erosion and mixing of subsoil with the sandy material of the underlying sandy strata. In places the lower subsoil is essentially the same as the subsoil of the Orangeburg or Ruston soil.

The type includes many small areas of a thin phase of Memphis silt loam, occurring principally along the crests of ridges. Eroded or gall spots of slightly deeper red or reddish-brown color are numerous in fields where the surface has been washed off, such areas consisting of silty clay loam or clay loam. The type also includes areas of Ruston silt or fine sandy loam and shaly Orangeburg fine sandy loam or sandy clay loam, occurring mainly on steep slopes around the heads of small streams. In many places sandy material from exposed beds of the underlying sandy strata has washed down the slopes and given the surface soil a decidedly variable texture.

The Lexington silt loam lacks uniformity over any considerable area. In the vicinity of New Bethel Church, for example, along the crest of the ridge extending from Paris south to Spring Hill Church, and in numerous other places where similar narrow ridges bordered by steep slopes occur, the surface soil to a depth of 5 or 6 inches is light gray in color and is underlain rather abruptly by reddish-brown heavy silty clay loam, which becomes more friable but not much lighter in texture below depths of about 24 to 30 inches. The timber growth here includes a large proportion of post oak. Along the east slope of the escarpment south of Paris and in the region east of this much of the type carries a high percentage of reddish

very fine sand, the soil being similar to the Ruston very fine sandy loam. In places, too, there is a thin surface covering of light-gray fine sand or fine sandy loam. The subsoil in some areas is a light-yellow or pale-yellow silty clay and often very compact. In some localities the subsoil is slightly mottled at about 28 to 36 inches with gray and yellowish brown. In other places the proportion of fine sand present in the subsoil is very small.

The Lexington silt loam is developed through the greater part of the county. In the western part it occurs principally as narrow strips, occupying the slopes along the stream courses, the more nearly level adjacent areas consisting of Memphis silt loam. Where the country is more broken and there are no well-preserved areas of Memphis silt loam this type occupies the entire area, except for the small strips of bottom land. Large bodies of this kind extend around the heads of Spring and Caledonia Creeks, over the southwestern corner of the county, around the small streams that enter Middle Fork Obion River, around Old Town and Cane Creeks south and west of Cottage Grove, and smaller areas are scattered throughout the greater part of the county. Extensive areas occur in the eastern part of the county on both sides of Blood River and adjacent to the bottoms of West Sandy Creek and Holly Creek.

Some of the type is undulating or gently rolling to rolling, and some, owing to deep and extensive gullying, is so broken that it has but little value for tillage, although it may be used for pasture. Both the surface drainage and underdrainage are good.

This type has been cultivated extensively, and a large part of it is at present under cultivation, possibly 40 per cent; but a considerable proportion has been abandoned on account of an impoverished condition of the land as a result of continuous cropping without due effort at maintenance of the humus supply, and on account of surface erosion and gullying. Such areas are grown up in sassafras, bushes, briers, broom sedge, and lespedeza, and so afford some pasturage. Considerable areas of the type are also forested, having never been cleared, although the larger part of the merchantable timber has been removed. The forest growth consists principally of chestnut, dogwood, red, white, post, and Spanish oak, sweet-gum, black gum, shellbark, hickory, laurel, tulip poplar, holly, cedar, beech, sassafras, elder, plum, and hazelnut. Many of the trees are remarkably large and well shaped, indicating by their size and the wide range in variety the productive nature of the soil. Much of the type is better suited to forestry or to forestry and grazing than to any other purpose.

The crops grown are the same as those on the Memphis silt loam, consisting of corn, tobacco, cotton, clover, wheat, sweet potatoes, and grass. In places the yields are good, almost as high as on the Memphis silt loam; but over considerable areas they are low, and as a whole the yields average decidedly lower than on the Memphis silt loam. Corn yields range from about 10 to 25 bushels per acre; tobacco 500 to 800 pounds; cotton, one-quarter bale; wheat, 6 to 10 bushels; and sweet potatoes, 150 bushels.

This soil is handled in much the same way as the Memphis silt loam; but the farm equipment is not so good, and the teams and machinery are lighter. Fertilizers are used only to a small extent,

principally on cotton, wheat, and tobacco, the amount being about the same as on the Memphis silt loam.

Land values where this is the prevailing type of a farm have a wide range, depending on condition of the soil with respect to erosion, improvements, and proximity to good roads and to markets. Where the soil has been well taken care of and the improvements are good the price at this time (1922) ranges from about $40 to $75 an acre. Areas including badly eroded and gullied tracts can be bought at prices ranging from around $15 to $25 an acre.

Recommendations for the upbuilding of the Memphis silt loam apply to this soil also. The incorporation of organic matter and deeper plowing are necessary. A crop rotation should be adopted in which corn is not grown in successive years, and in which clover, soybeans or cowpeas, and perhaps sweet clover, are included. Contour cultivation and terracing are absolutely essential on much of this type, if erosion is to be effectively handled. This refers to cultivated fields. The rougher areas, of course, should be allowed to revert to forest and used as a source of fuel, posts and lumber. Many of the badly eroded and gullied fields could be used for pasture land, using Bermuda grass on the gully banks, and bluegrass, clover, or lespedeza on the smoother portions. Large gullies could be checked by planting to trees, black locust being good for this purpose, and by planting Bermuda grass, honeysuckle, kudzu and sweet clover. Where it is desired to fill up a gully it can be done in a comparatively short time by use of a Christopher dam. This consists of an earth dam across the lower end of the gully under which is a pipe for passage of water. On the upper side a joint is attached to the pipe, raising the opening a few feet above the bottom of the gully. When sediment is washed down against the dam the clear water rises to the height of the pipe opening and is carried off. As the gully is filled with sediment, the pipe opening should be raised higher, always keeping it a few feet higher than the filled material at the bottom of the gully.

Lexington silt loam, rolling phase.—The rolling phase of the Lexington silt loam consists of about 3 to 8 inches of yellowish-brown to light-brown silt loam passing into brownish-red or buff-colored silty clay, which grades at depths of about 12 to 15 inches into reddish sandy clay. The lower subsoil often consists of a bed of rounded gravel or chert, but usually there is considerable interstitial red clay serving as a matrix or binder. In places gravel is found immediately beneath the surface soil. In other areas gravel is present only on the surface.

On the smoother ridge crests the soil is deeper and more like the Memphis silt loam. Frequently red clay and gravel are exposed in gullies. Some Ruston fine sandy loam is included with this phase.

The rolling phase occurs in isolated areas in the eastern part of the county. The largest area is on the west side of Blood River next to the State line. Another area occurs 2 miles south of Point Pleasant Church.

Most of this land is very rolling and is characterized by high ridges with very steep slopes. It has good drainage; in fact, the surface run-off is so rapid that erosion would prove disastrous to cultivated fields. The phase is not cultivated but is forested to a

growth composed largely of red, post, and white oaks, tulip poplar, chestnut, and dogwood. This land is valuable for forestry and grazing. Most of it is not farm land, except for the use that can be made of it for permanent pasture and farm wood lots.

PHEBA SILT LOAM

The Pheba silt loam is a gray to brownish or yellowish-brown silt loam grading at about 3 to 8 inches into reddish-brown or dull-red to reddish-yellow silty clay loam to silty clay, usually becoming heavier with increasing depth. At depths ranging from about 15 to 30 inches this soil becomes more compact and lighter in color, grading into gray or yellow rather silty fine sandy clay, mottled with gray, and containing rusty-brown to black concretionary material. Concretions are common in both soil and subsoil. The entire soil section contains a higher percentage of sand than do the Memphis or Grenada soils.

Along the Paris-Mansfield road for some distance south from Paris the underlying light-colored clay of the formation known geologically as the Porters Creek clay is exposed in the cuts and gully banks and has the appearance of light-gray, fine-grained shale. Where the type is level or nearly so the gray clay comes near the surface, but on some of the slopes near streams or on mounds or ridges the gray material has a deeper surface covering of the less gray material. Areas on the ridges and higher up on the slopes, in which the deep subsoil is only mottled instead of being all gray, have been included with this type.

The Pheba silt loam occupies several areas between Paris and the south county line and one area just west of India. It is not important owing to its small extent. It has about the same agricultural value as the Grenada silt loam. About 60 per cent of it is cleared and used for crops or pasturage.

RUSTON FINE SANDY LOAM

The Ruston fine sandy loam is a grayish-brown to gray loamy fine sand to silty fine sandy loam, passing at variable depths, usually from about 3 to 8 inches, into grayish-yellow or pale-yellow loamy fine sand, or into silty fine sandy loam, underlain at about 10 to 12 inches by buff-colored to reddish-brown or yellowish-red friable silty clay containing some fine sand, this grading into a reddish-yellow or yellowish-red friable fine sandy clay. Some ferruginous rock is seen in subsoil exposures in places.

On a badly eroded slope of the West Sandy Creek southwest of Springville the texture of the surface soil ranges to a silty loam in places and there are many included gullies and eroded patches of sandy clay and sandy clay loam of red color, which are conspicuous features of the landscape. In these eroded exposures of the Coastal Plain material there are fragments of platy, ferruginous rock. Near the upper slopes there are included patches of Pheba silt loam and silty clay loam too small to map.

In places this soil consists of 6 to 8 inches of gray to grayish-brown fine sandy loam to silty fine sandy loam, underlain at about

10 or 12 inches by buff-colored, dull-red or yellowish-red friable silty clay containing some fine sand, underlain in turn at about 16 to 20 inches by reddish-yellow or yellowish-red friable fine sandy clay.

This type and the associated Lexington silt loam merge into each other in such a way that it was frequently difficult to establish boundaries separating them. Unimportant patches of Lexington silt loam, Ruston very fine sandy loam, Ruston sandy loam, Orangeburg fine sandy loam, and eroded spots of Ruston and Orangeburg clay loam and sandy clay loam have been included with this type, because it was impracticable to separate them satisfactorily on a map of the scale used. In many places there is a high proportion of silt in the surface soil. Much of the area east of Walters Store consists of Ruston sandy loam. Ferruginous sandstone is seen locally on the surface and in subsoil exposures; and in a few places some rounded chert gravel.

The Ruston fine sandy loam is developed chiefly in the eastern part of the county. It occurs mainly at the heads of draws and on steep slopes. Several large areas lie between the Blood and Tennessee Rivers; a large area lies in the eastern part of the county between the Big Sandy and Tennessee Rivers, and several others between the Big Sandy and West Sandy Creek. The type occupies a rough rolling country and has good drainage. Nearly all of it is in forest made up mostly of chestnut, dogwood, red, white, and post oaks, and sweetgum.

Because of its sloping surface, eroded condition, and susceptibility to further destructive washing, the greater part of this type is probably best suited for grazing and forestry. The smoother tracts, where of sufficient size, can be terraced and used for such crops as cotton, corn, oats, forage crops, sweet potatoes, and other vegetables. Fairly liberal use is made of commercial fertilizer on the Ruston fine sandy loam in various parts of the southwestern States in the production of such crops as cotton, corn, oats, and potatoes. Addition of mixtures averaging about 8 to 10 per cent of phosphoric acid, 2 to 4 per cent of nitrogen, and 2 to 4 per cent of potash have been made profitably on these crops. The soil can be improved by growing and occasionally plowing under cowpeas.

RUSTON VERY FINE SANDY LOAM

The Ruston very fine sandy loam consists of about 6 to 8 inches of grayish, rather silty, very fine sandy loam, underlain by yellow or reddish-yellow silty clay loam which grades at about 22 to 30 inches into reddish-yellow to dull-red friable fine sandy clay.

In places the subsoil contains grayish or yellowish-red mottling. In some areas the surface soil is a silt loam. This type occurs principally from Paris southward to the county line. It occupies undulating and gently rolling areas and is well drained. Only a small proportion of it is cultivated and the yields are relatively low. It could be used for raising beef cattle and hogs. Cotton, corn, and oats are the crops that are likely to give best results. The soil can be improved by increasing the humus supply and by growing soil-improving crops.

BAXTER GRAVELLY LOAM

The Baxter gravelly loam consists of soil with an abundance of angular chert fragments, occurring usually on stream slopes. In general the fine soil material consists of 3 or 4 inches of brown to yellowish-brown silt loam, underlain by pale-yellow or yellowish-red silty clay loam. The lower subsoil is brownish-red in color and consists of a mixture of chert and red clay. The abundance of gravel will make cultivation difficult. There are some included patches of Baxter silt loam, which consist of a gray silt loam, underlain at about 6 inches by yellowish-red silty clay, with much angular chert gravel.

The type is found mainly in small bodies in the eastern part of the county in a rough, rolling country. All of it is forested with hardwood. Nearly all of this land is nonarable, due to the steepness of slope and to the abundance of gravel.

OLIVIER SILT LOAM

The Olivier silt loam is a yellowish-brown or light-brown to mottled brown and gray silt loam, underlain at about 8 to 10 inches deep by yellowish-brown, yellow, or mottled gray, or bluish-gray and brown silty clay or silty clay loam, passing below into compact silt loam or silty clay loam mottled gray and yellow, and containing dark-colored concretions and concretionary material. Some concretions usually are present in the soil and upper subsoil. In places the upper subsoil is a mottled brown and gray silty clay loam and the lower subsoil a mottled gray and yellow heavy, tough, plastic silty clay.

In places this type merges into the Collins silt loam in such manner that it is difficult to show a definite boundary between the two types. Some small areas of the Collins silt loam have been included with the Olivier silt loam, and also a few areas of Lintonia silt loam.

The Olivier silt loam occurs in scattering bodies on the terraces along many of the streams, usually in association with and adjacent to the Collins silt loam. The surface is generally nearly level or only slightly sloping, faintly relieved in places by hummocks and swales.

The drainage is generally poor, but part of the type, where the subsoil is not extremely dense or compact, has better drainage. The drainage is better than that of the Calhoun soils and crops succeed better.

Nearly all of the type is in cultivation or used for pasture. Tobacco and corn are the principal crops. They succeed fairly well.

The practice of crop rotations, including the nitrogen and humus-supplying legumes, would tend toward the development of a more productive soil. Lime, also, would prove helpful in connection with such soil-improving methods, and the digging of ditches to remove excessive accumulation of surface rain water.

CALHOUN SILT LOAM

The soil of the Calhoun silt loam is a light-gray or mottled gray and brown silt loam about 3 or 4 inches deep, with a subsurface of mottled yellowish-brown and gray silt loam. The subsoil, beginning at depths of about 15 to 24 inches, is a silty clay, mottled gray or

bluish gray and yellowish brown or yellow. The lower subsoil is compact and dense and contains some black and rusty-brown concretionary material. In places a few fragments of small rounded gravel occur within the 3-foot section.

This soil has been mapped on the second bottoms of streams. There is an area at Sulphur Well and a few others lie along the streams emptying into Big Sandy River. The surface is flat to slightly undulating. Both the surface and the internal drainage are poor, except that the surface run-off is good on the undulating part.

Very little of the type is farmed. Most of it is covered with a good growth of timber. It has about the same agricultural capacity as the Waverly silt loam, with the advantage that it is not subject to overflow.

LINTONIA SILT LOAM

The surface soil of the Lintonia silt loam is a brown, yellowish-brown, or reddish-brown silt loam ranging from about 6 to 12 inches deep, the reddish color being most common in the better drained situations and where the soil is shallow. The subsoil consists of reddish-brown or buff-colored silty clay of a moderately friable structure. The lower subsoil is often more silty, and usually contains dark-colored concretionary material. Where the drainage is poorer, gray mottling is sometimes found in the lower subsoil. In a few places a small percentage of fine or very fine sand is present in the soil and subsoil. In some respects the soil looks much like the Memphis silt loam.

The Lintonia silt loam occurs mainly in scattering areas in the western part of the county. It is developed along or near streams within the area of the Memphis silt loam and Lexington silt loam. In places there is no well-defined topographic line between this soil and the adjoining first bottom; but this type occupies, in such situations, the highest part of a gradual slope toward the upland. In some places the type is nearly level. The drainage is good.

This is a productive soil, and all of it is cleared and used for farm crops. Corn yields about 40 to 60 bushels per acre, and other crops do correspondingly well.

ELK SILT LOAM

The Elk silt loam has a brown silt loam soil underlain at about 6 or 8 inches by yellowish-brown, friable silty clay loam. The lower subsoil is yellowish brown to yellow, with some black concretionary material, and mottled in places with gray.

This type lies adjacent to the Huntington silt loam on second bottoms, or stream terraces. It is much like the Huntington, except that the subsoil is characteristically more friable and it is not subject to overflow. The areas have in some cases been separated from the hills by the valleys of small streams. A few long, narrow depressions, marking the sites of former stream beds, occur in places. These are swampy or marshy during wet seasons, but usually dry up in summer.

All of the type is cultivated. Corn, tobacco, grass, and clover do well. Alfalfa has been grown with good results and could easily

be grown over the entire type. Rotations including the legumes should be practiced in order to keep the soil in prime productive condition.

One small strip of Elk loam extends southward from the mouth of the Big Sandy River for about 2 miles. The surface soil of 6 or 8 inches consists of a brown loam; this grades into lighter brown fine sandy loam, and passes at about 18 inches into light-brown or yellowish-brown fine sandy clay or silty clay loam. This is all in cultivation, producing good yields of the general farm crops without fertilization. This area is not shown separately on the soil map because of its small extent and very close approximation to the character and value of the Elk silt loam.

COLLINS SILT LOAM

The Collins silt loam is a brown or light-brown silt loam frequently faintly mottled with gray and rusty brown, grading at about 6 to 12 inches into mottled brown and gray heavy silt loam to silty clay loam, and underlain at about 18 to 20 inches by light-gray or bluish-gray silty clay or silty clay loam, mottled in varying degrees with yellow. Locally the texture of the lower light layer is quite silty; again clay of an impervious nature may be found at about 36 to 40 inches. Dark-colored concretions and concretionary material are generally present in the subsoil. There are places where the content of these is high enough to give the lower subsoil a compact hardpanlike character. Some areas, on the other hand, have a rather sandy subsoil, with brown and rusty-brown mottlings. In dry weather the immediate surface soil has a gray to whitish appearance.

In some areas a mottled gray and brown silt loam is underlain at about 12 to 15 inches by yellowish-brown silty clay loam, showing brown mottlings at a depth of about 25 inches, and passing into a yellowish-brown silty clay at about 30 inches, mottled with gray at about 34 inches. Several areas of Collins fine and very fine sandy loam have been included with the type on the soil map. These consist of brown fine sandy loam and very fine sandy loam about 6 to 10 inches deep, underlain by mottled gray and brown fine sandy loam, or very fine sandy loam, which at depths of about 10 to 20 inches is underlain by yellow, heavy silty clay loam, mottled brown and gray which, in turn, is underlain by fine sandy clay, mottled gray and yellowish brown. On the Reynoldsburg road near Big Sandy River there is an area of brown or mottled gray and brown fine sand grading at about 6 to 8 inches into gray loamy fine sand, with yellowish-brown mottlings. In places, fine sandy clay mottled yellowish brown and gray is encountered at about 12 to 15 inches, the clay content increasing with depth. In some areas the surface soil is a mottled gray and brown silt loam about 8 inches deep over lighter gray fine sandy loam passing into gray fine sandy loam, mottled yellowish brown and brown, this grading at about 30 inches into fine sandy clay of the same color. A few patches of Collins silty clay loam and clay, occuring in depressions have not been separated from the Collins silt loam.

Near the banks of some streams, the soil is a brown silt loam about 8 or 12 inches deep, overlying lighter colored or yellowish-brown silty clay loam or silty clay. This more uniformly colored and

better drained soil would have been mapped as Vicksburg silt loam if found in areas of important size. In the first bottom of a small stream about 2 miles west of Paris, another included area of quite variable soil was included with the Collins silt loam. Predominantly this consists of reddish-brown loam or silty loam extending downward without much change or else passing through interstratified layers of brown and reddish-brown silt loam and sandy loam or fine sandy loam. This reddish soil is given the name Hannabatcher where found in areas large enough to map. Not much of it occurs in any single body in Henry County.

The Collins silt loam occupies the first bottoms of most of the small streams and the creeks. It is all subject to overflow. The surface is essentially level, having of course, a slight downstream gradient and often a rise toward the uplands. The bottoms vary from narrow strips near the sources of the streams to areas one-half mile to a mile or more in width along the larger creeks. The soil represents recent alluvium, that is, material deposited by streams in time of overflow. In places there is an admixture of colluvial material washed down from adjacent slopes of the uplands.

In its natural state the Collins silt loam is very poorly drained. The level or nearly level surface and the compact structure of the lower subsoil do not permit rapid running off of surface water or the downward movement of it. Canals have been cut through several large areas of this type, and it is now possible to drain much of it by cutting lateral ditches, but very little of it has been improved by this method.

Most of this type is in forest or is used for pasture. Probably about 40 per cent is cleared. The timber growth consists of white oak, willow oak, water oak, hickory, black gum, sweetgum, ash, beech, birch, maple, sycamore, alder, and ironwood, with some persimmon, willow, holly, and pawpaw.

A small proportion of the Collins silt loam is used for the production of corn, tobacco, and sorgo, with fairly good results. Usually the areas near the uplands are used instead of those places close to the streams. The main present use of the type is for pasturage. Tobacco yields on the average about 600 to 800 pounds per acre, while corn produces about 30 to 45 bushels. A small amount of fertilizer is used occasionally for tobacco.

The present valuation of the Collins silt loam ranges from about $15 to $35 an acre, depending upon the location, the natural drainage, the improvements in the way of clearing and ditching. Improvement could be brought about by ditching and by growing an occasional humus-supplying crop. Additions of lime undoubtedly would be followed by better yields, especially of the legumes that could be grown to advantage in rotation with the nonlegumes. Commercial fertilizer, acid phosphate in particular, could be used with some benefit unquestionably in the other fields which are not so frequently overflowed.

WAVERLY SILT LOAM

The Waverly silt loam is a brown silt loam, mottled with gray and rusty brown, 3 or 4 inches deep, overlying whitish silt loam of a floury feel, extending to depths of about 20 or 24 inches, where it

is underlain by pale-yellow silty clay, stratified with the white silt loam. In places the lower subsoil consists of bluish-gray silty clay with yellowish and rusty-brown mottlings. When plowed, the whitish subsurface material will be mixed with the soil to form a grayish silt loam. Much of the type is a gray or bluish-gray silt loam, grading into bluish-gray, brownish-gray or grayish-brown silty clay loam. This more grayish phase is the characteristic soil of the permanently soggy bottoms. Varying quantities of concretions and concretionary materials are present over the surface of this soil and occasionally in the subsoil.

As mapped the type includes patches of Collins silt loam. Some areas at the foot of the uplands have received an overwash of material from the adjacent slopes. Where concretions are exceptionally abundant, the soil is known as "buckshot" land and where it is very compact, whitish, or soggy it is frequently styled "crawfish land." Usually these "buckshot" and "crawfish" areas are a light-grayish or white silt loam overlying plastic, bluish-gray silty clay, with rusty-brown mottlings.

The main bodies of Waverly silt loam are found along West Sandy Creek near Springville, and along Big Sandy River above its confluence with the Tennessee River. It occurs, also, along some of the smaller streams and branches.

The surface is level or essentially so, with often a slight slope from the foot of the uplands toward the stream bank. A few wet basinlike depressions occur through the type.

The Waverly silt loam is poorly drained and subjected to annual overflow from the streams along which it occurs. Along Big Sandy River the type is frequently swampy and often it is inundated by backwater from the Tennessee River.

The type is covered with a growth of beech, hickory, overcup oak, water oak, willow oak, elm, ironwood, black gum, sweetgum, birch, maple, cassena, red haw, and ash. Some of the very wet areas with sandy overwash material from near-by slopes are covered by a dense growth of alder, interspersed with swamp maple.

A very small proportion of this type is cultivated. If well drained by ditching and canalizing, fairly good yields of some crops are obtained. Good yields of cotton and tobacco have been produced in years of favorable rains, that is, not too heavy or light rains. The whitish, imperfectly drained soils of the humid region are not generally considered good corn soils; in fact they are not generally considered particularly productive of any crops, except the moisture-loving grasses, lespedeza, and rice; yet, with evenly distributed rainfall of moderate amount, good yields of corn are sometimes made as well as of other crops. The whitish alluvial soils of the loessial region streams and of the Mississippi River bottoms are believed to be rather more productive than the whitish soils of the Coastal Plain stream bottoms. The type affords good pasture, and can be profitably used in the production of hay.

The price of the Waverly silt loam depends upon the location, the drainage condition, and, of course, the state of the land with respect to clearing. The price varies at this time from about $10 to $30 an acre.

HUNTINGTON SILT LOAM

The surface soil of the Huntington silt loam consists of about 12 to 14 inches of light-brown to dark-brown, mellow silt loam. The subsoil is slightly heavier, consisting of lighter brown or yellowish-brown heavy silt loam to silty clay loam. In places the lower subsoil is pale yellow, mottled some with gray and contains small amounts of concretionary material.

This type occurs in the bottoms of the Tennessee River. In a few places narrow strips of Huntington fine sandy loam occur near the river bank; but these have been included with the silt loam on the soil map. Two strips of the silt loam, averaging in width from one-quarter to one-half mile, have been mapped. One starts near Paris Landing and continues to the northern boundary of the county; the other extends from Bradford Landing south to the Benton County line. The soil is of recent-alluvial origin. Its material has been washed to a considerable degree from the limestone uplands of the Tennessee drainage basin also but contains wash from the sandy and loessial lands of the basin.

The Huntington silt loam has good drainage between overflows. It is a highly productive soil, well adapted to the growing of corn, producing in good years from about 45 to 60 bushels per acre. Grass and clover do well, and from 1 to 2 tons of hay are sometimes cut from an acre. When seeded to grass the type makes excellent pasture. Wheat frequently does not do well, as it is often injured by spring overflows.

Huntington silt loam, imperfectly drained phase.—The imperfectly drained phase consists of a brown to dark-brown silt loam about 4 to 8 inches deep, underlain by heavy silt loam or silty clay loam of a dark-brown or a slightly yellowish brown color which grades at about 16 to 20 inches into compact silty clay or silty clay loam of the same color. Black concretionary material is usually present through the 3-foot section.

The phase occurs adjacent to or in depressions or abandoned channels in the Huntington silt loam. The surface is level, and the drainage is not quite so good as on the typical soil. About half of the phase has been cleared for cultivation; the remainder is in forest consisting chiefly of water oak, hickory, cypress, sweet-gum, black gum, elm, ash, and beech. The soil is not as good as the typical Huntington silt loam, and the average yields of corn are somewhat lower. It affords good pasturage and is used largely for this purpose.

MEADOW

Meadow consists of soil material occupying the narrow bottoms of small streams, which could not be satisfactorily separated into definite types. This material varies widely in color, texture, and structure within narrow limits though it includes small areas of established soil types. The predominant material at the surface seems to be fine sandy loam, loam, and silt loam. Through the 3-foot section there are extreme variations both in the color and texture of alternating layers. In places the material is a brown or grayish-brown fine to medium sand extending to a depth of three or more feet; in other places the soil is a brown silt loam to about

6 or 8 inches, passing through interstratified layers of sand, loamy sand, fine sand, silt loam, silty clay loam, and silty clay, brown, reddish, gray or mottled in color. Rusty-brown mottling is very common in the soil and subsoil.

Meadow includes small areas of Collins silt loam and Collins fine sandy loam. Coarser material occurs near the stream banks, while finer material of silt and clay is found farther away from the banks. Some included areas consist of reddish-brown loam or light loam or silt loam, extending downward without much change or passing through interstratified layers of brown and reddish-brown silt loam, sandy loam, fine sandy loam, and material of other texture. These reddish soils represent Hannabatcher soils which have not been mapped separately in this county.

Meadow occupies first bottoms and is subject to overflow. About one-third of it, roughly estimated, has been cleared, and is now being used for pasture or for growing corn. The yields of corn vary considerably, depending upon the character of the soil in the field, upon the natural and artificial drainage, and of course, upon the soil treatment. Hay could be cut from land of this kind in properly prepared meadows.

SUMMARY

Henry County, Tenn., is situated near the northwest corner of the State. It comprises 588 square miles, or 376,320 acres, about 55 per cent of which is classed by the census as improved farm land. The unimproved land occurs largely in the eastern half of the county and consists for the most part of hilly uplands.

The elevation within the county ranges from about 350 to 610 feet above sea level. Topographically, it consists, in the uplands, of smooth flattish to undulating and gently rolling areas, with steep slopes along the valley walls of streams, often scarred by erosion. In the eastern part of the county there are some very rolling areas, unfit, in part, for cultivating. The smoother areas are very well suited to tillage; the slopes and rougher areas should be used for pasturage and timber. The drainage of the uplands is generally well established, being imperfect under some of the flatter Grenada silt loam. The run-off of many slopes is so rapid that efficient terraces should be constructed in all cultivated fields, otherwise such slopes should be used for pastures and wood lots or timber.

The stream bottoms are flat, and essentially level but for the slight downstream gradient. These bottoms are all subject to overflow. The underdrainage in many places is not very good, as in case of the Collins silt loam; while some areas, the Waverly soils, are very poorly drained at all times practically. The second-bottom soils are those on the stream terraces. They are nearly level to undulating and range in drainage condition from good to poor. They stand above overflow.

The population of Henry County in 1920 was 27,151. Paris, the county seat with a population of 4,730, is the only town with more than 2,500 inhabitants.

The county is traversed by the Louisville & Nashville Railroad, and the Nashville, Chattanooga & St. Louis Railway, affording connections with markets in all directions.

The climate is mild and pleasant, with a growing season of 194 days, and with ample rain for crops.

A large number of crops are raised in the county, but corn, tobacco, cotton, wheat, hay, and sweet potatoes are the principal ones. Some livestock is raised, mainly cattle and hogs.

The farm practices are fairly good, but there is need of better crop rotation, including the more extensive use of the legumes such as clovers, soy beans, cowpeas, sweet clover, and lespedeza. The use of fertilizers and lime on the poorer soils is a means of increasing yields, the lime being used chiefly for legumes grown in rotation with other crops. Increased attention to animal husbandry, with increased production of cattle, sheep or lambs, hogs, and dairy products could be very successfully carried out in so far as soil adaptation relates to these industries. The increased manure from the livestock would constitute an item of considerable importance in connection with the problem of soil improvement.

Present land values range from about $10 to $150 an acre. The higher prices are obtained for the best improved farms on the Memphis and Lexington silt loams. The poorly drained areas may be purchased for about $10 to $30 an acre.

The soils of the uplands include types of the Memphis, Henry, Lexington, Grenada, Pheba, Ruston, and Baxter series. The alluvial soils are those of the Lintonia, Olivier, Calhoun, and Elk on the stream terraces; and of the Collins, Waverly, and Huntington series in the first bottoms.

The Memphis silt loam is the most valuable type in the county. It is well adapted to the growing of corn, tobacco, wheat, red clover, and grass. These are the main crops. Lespedeza, sweet potatoes, vetch, sweet clover, and vegetables will do well.

The Lexington silt loam occupies the largest area in the county, but only about half of it is under cultivation. Much of it has been injured by erosion, which has carved out unmanageable gullies on many of the steeper slopes. The smoother areas could be handled successfully, especially by terracing the slopes. This type produces very well, being adapted to the same crops as the Memphis silt loam.

The Grenada and Pheba silt loams are brown soils with grayish-brown and gray mottled subsoils. They have poor underdrainage that diminishes average yields to some extent.

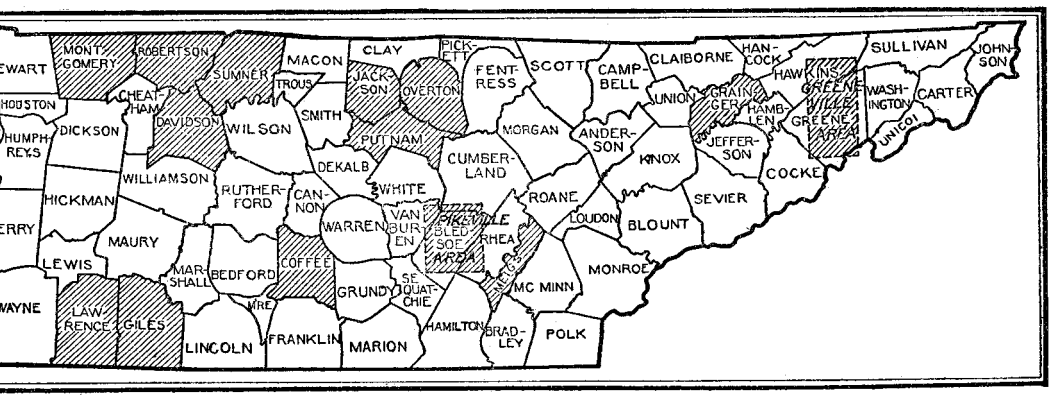
The Ruston soils generally occupy hilly or rolling country, the larger part being forested and only small areas cultivated. They are well adapted to cotton when smooth enough for efficient cultivation, and such crops as peanuts and cowpeas. Corn gives fair yields. Fertilizers are needed for all crops on the sandy Ruston soils. Pasturing livestock is the best use for the rougher areas, together with the production of trees.

The Baxter gravelly loam is a cherty soil of small extent and little importance.

The Collins and Olivier silt loams are brown or grayish-brown soils underlain in the deep subsoil by gray layers of silty clay loam or silty clay. They are poorly drained. The Collins occurs in the overflowed bottoms and the Olivier on the second bottoms. These are fairly good to good farm lands, according to drainage and treatment. The Waverly and Calhoun silt loams are very poorly drained.

and are largely uncultivated, but they produce good timber, and afford some valuable grazing. The Waverly occurs in the overflowed bottoms, while the Calhoun is confined to the second bottoms. All of them are good grass and lespedeza soils. Corn does well on the Collins and Olivier in years of moderate rainfall but does not do so well on the poorer drained lighter colored Calhoun and Waverly, unless the rains are moderate and evenly distributed.

The Huntington silt loam is an important, very productive alluvial soil—the characteristic well-drained first bottom type of the Tennessee River. It is used mainly for the production of corn and hay, of which large yields are obtained. The Elk silt loam is similar to the Huntington, but occurs on second bottoms above overflow. It is adapted to the same crops. The Lintonia silt loam occurs in isolated areas throughout the county. This is a well-drained second-bottom type of good productive capacity and practically all of it is cultivated.



Areas surveyed in Tennessee, shown by shading

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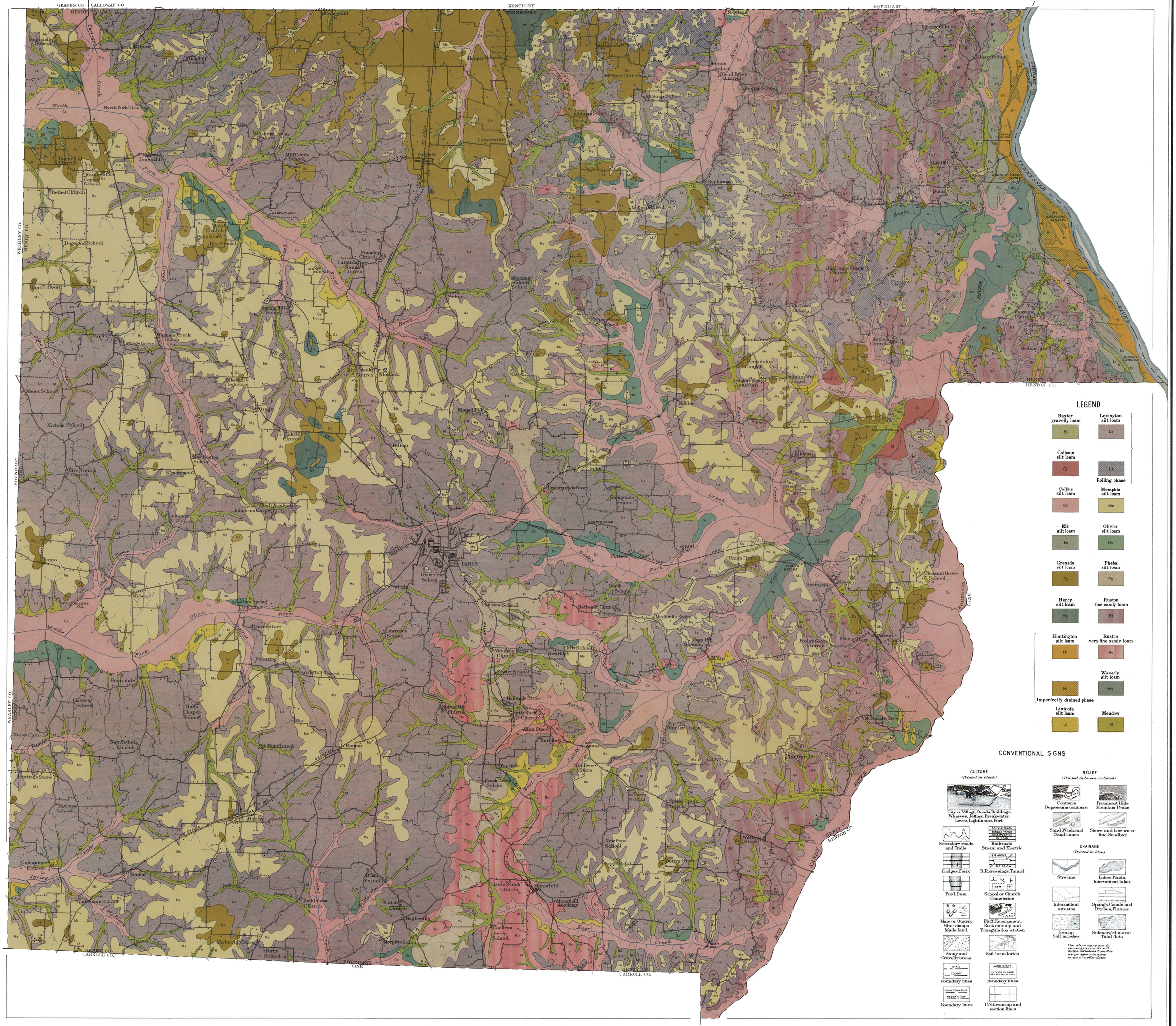
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS
IN COOPERATION WITH THE
TENNESSEE GEOLOGICAL SURVEY

SOIL MAP

TENNESSEE
HENRY COUNTY SHEET



Soils surveyed by Robert Wildermuth, in charge, A. T. Sweet and L. L. Brinkley, of the U. S. Department of Agriculture and H. E. Hamilton, E. S. Perry, and J. H. Agee, of the Tennessee Geological Survey

Base surveyed by the Tennessee Geological Survey

Scale 1 inch - 1 mile
1 ½ 0 1 2 3 4 Miles

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Field Operations
Bureau of Soils
1922